SVENSK STANDARD
SS-ISO 12141:2020

Utsläpp från stationära källor – Bestämning av masskoncentration av dammpartiklar vid låga koncentrationer – Manuell gravimetrisk metod (ISO 12141:2002, IDT)

Stationary source emissions – Determination of mass concentration of particulate matter (dust) at low concentrations – Manual gravimetric method (ISO 12141:2002, IDT)

Svenska Institutet för Standarder

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Europastandarden ISO 12141:2002 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 12141:2002.

The European Standard ISO 12141:2002 has the status of a Swedish Standard. This document contains the official version of ISO 12141:2002.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 12141 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

Annexes A, C, E and F form a normative part of this International Standard. Annexes B, D, G, H and I of this International Standard are for information only.

Introduction

This method was developed from close liaison and cooperation between ISO/TC 146/SC 1/WG 11 and CEN/TC 264/WG 5, resulting in the preparation of this International Standard and the European Standard EN 13284-1. This International Standard is similar to EN 13284-1 with additional emphasis given on the use of high-volume sampling techniques for the measurement of dust at low concentrations. It also gives procedures for extending the range of measurement of ISO 9096:1992 to lower concentrations. As in ISO 9096:1992, a representative, integrated sample is extracted from the flue gas and particulate matter entrained in the gas sample is separated by a filter. The pre-weighed filter is subsequently dried and weighed. Any increase in the mass is attributed to the collection of particulate matter on the filter.

To meet the specifications of this International Standard, the particulate sample must be weighed to a specified level of accuracy. At low dust concentrations, this level of accuracy may be achieved by:

a) exercising extreme care in weighing, as per procedures of this standard,

b) extending the sampling time at conventional sampling rates, or

c) sampling at higher rates for conventional sampling times (high-volume sampling).

This International Standard in addition differs from ISO 9096:1992 by requiring the measurement of the mass of filter blanks, specifying weighing procedures.

This method may be used for calibration of automated monitoring systems (AMSs) (see ISO 10155). If the waste gas contains unstable, reactive or semivolatile substances, the measurement will depend on the filtration temperature, and in-stack methods may be more applicable than out-stack methods for the calibration of automated monitoring systems.

Stationary source emissions — Determination of mass concentration of particulate matter (dust) at low concentrations — Manual gravimetric method

1 Scope

This International Standard describes a reference method for the measurement of low dust content in ducted gaseous streams at concentrations below 50 mg/m^3 under standard conditions. This method has been validated with special emphasis on the region around 5 mg/m^3.

This International Standard has been developed and validated for gaseous streams emitted by waste incinerators. More generally, it may be applied to emissions from other stationary sources, and to higher concentrations.

If the gases contain unstable, reactive or semi-volatile substances, the measurement will depend on the sampling and filter treatment conditions.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3966:1977, *Measurement of fluid flow in closed conduits — Velocity area method using Pitot static tubes*

ISO 5725 (all parts), *Accuracy (trueness and precision) of measurement methods and results*

ISO 9096:1992, *Stationary source emissions — Determination of concentration and mass flow rate of particulate material in gas-carrying ducts — Manual gravimetric method*

ISO 10780:1994, *Stationary source emissions — Measurement of velocity and volume flowrate of gas streams in ducts*

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1
particulate matter
dust
particles, of any shape, structure or density, dispersed in the gas phase under the sampling conditions

NOTE In the method described, all the compounds that may be collected by filtration under specified conditions after sampling of the gas to be analysed, and which remain upstream of the filter and on the filter after drying under specified conditions, are considered to be dust (or particulate matter). However, for the purposes of some national standards, the definition of particulate matter may extend to condensibles or reaction products collected under specified conditions (e.g. temperatures lower than the flue gas temperature).

3.2
filtration temperature
temperature of the sampled gas immediately downstream of the filter

3.3
in-stack filtration
filtration in the duct with the filter in its filter holder placed immediately downstream of the sampling nozzle

3.4
out-stack filtration
filtration outside the duct with the filter in its heated filter holder placed downstream of the sampling nozzle and the suction tube (sampling probe)

3.5
isokinetic sampling
sampling at a flowrate such that the velocity and direction of the gas entering the sampling nozzle (v_n) are the same as that of the gas in the duct at the sampling points, v_s

See Figure 1.

NOTE The velocity ratio v_n/v_s expressed as a percentage characterizes the deviation from isokinetic sampling.

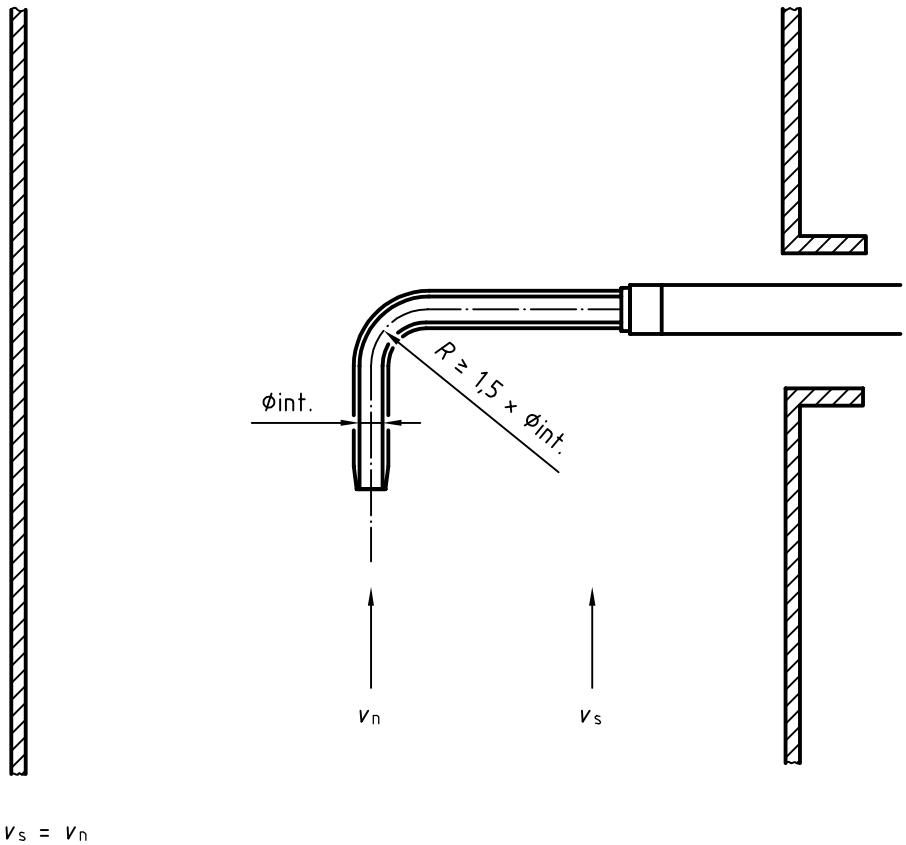


Figure 1 — Isokinetic sampling in duct

3.6
hydraulic diameter
d_h
characteristic dimension of a duct cross-section

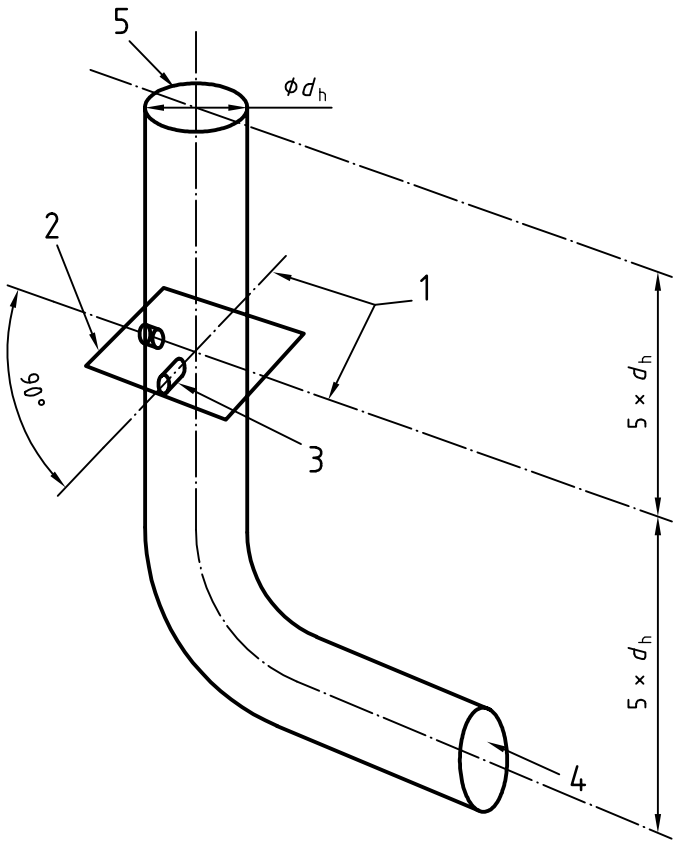
$$d_h = \frac{4 \times \text{area of sampling plane}}{\text{length of perimeter of sampling plane}} \quad (1)$$

3.7
sampling plane
plane normal to the centreline of the duct at the sampling position

See Figure 2.

3.8
sampling line
line in the sampling plane along which sampling points are located, bounded by the inner duct wall

See Figure 2.



Key

1	Sampling lines
2	Sampling plane
3	Access port
4	Flow
5	Top of duct

Figure 2 — Illustration of definitions in relation to a circular duct